



JANET T. MILLS
GOVERNOR

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION



GERALD D. REID
COMMISSIONER

Memorandum

To: Licensed facilities that land apply, compost, or process sludge in Maine
From: David Burns, P.E., Acting Director, Bureau of Remediation and Waste Management *David Burns*
Date: March 22, 2019
Re: Requirement to analyze for PFAS compounds

Background:

Per- and polyfluoroalkyl substances (PFAS) are a group of man-made chemicals that includes PFOA, PFOS, PFBS, and many other compounds. PFAS have been manufactured and used by a variety of industries around the globe, including in the United States since the 1940s. PFOA and PFOS have been the most extensively produced and studied of these chemicals. Both chemicals are persistent in the environment and in the human body – meaning they don't readily break down and can accumulate over time. Additionally, there is evidence that exposure to PFAS can lead to adverse human health effects.¹ PFAS can be found in many places including food packaging, water and stain resistant products, non-stick products, certain firefighting foams, and many others. Because these chemicals are so prevalent and don't easily break down, they can be concentrated through the wastewater treatment process. In 2016, the US Environmental Protection Agency (EPA) established a health advisory level in drinking water of 70 parts per trillion (ppt) combined for two PFAS compounds – PFOA and PFOS.

In late 2016, the Department became aware that a monitoring well located at a dairy farm in southern Maine which had previously agronomically utilized residuals had groundwater which exceeded the EPA health advisory level. The Department sampled drinking water, groundwater, surface water, soil, manure, hay, feed, and milk at this farm. Although not conclusive, results of this testing indicate that the land application of wastewater treatment plant sludge/biosolids may have contributed to the contamination of this farm with PFAS compounds.

On July 8, 2018, the *Solid Waste Management Rules: Beneficial Use of Solid Wastes*, 06-096 C.M.R. ch. 418, Appendix A was revised to include screening concentrations for three PFAS compounds: PFOA (0.0025 mg/kg), PFOS (0.0052 mg/kg), and PFBS (1.9 mg/kg).

Pertinent Regulations and Licensing Authority:

The *Solid Waste Management Rules: Agronomic Utilization of Residuals*, 06-096 C.M.R. ch. 419, § 4(A) requires that a residual must be physically and chemically suitable for the intended utilization activity, must be non-hazardous, and must be of a known and consistent quality. 06-096 C.M.R. ch. 419, § 4(C) further requires that the residual generator must develop and implement a waste characterization sampling and analytical work plan in accordance with the *Solid Waste Management Rules: Water Quality Monitoring, Leachate Monitoring, and Waste Characterization*, 06-096 C.M.R. ch. 405.

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06-096 C.M.R. ch. 405, § 6(B)(2) requires the development of a waste characterization sampling and analytical work plan for initial and ongoing characterization. Further, 06-096 C.M.R. ch. 405, § 6(D) requires that solid wastes proposed for agronomic utilization must be characterized based on specific characteristics. The group of parameters that the generator may be required to analyze for depends upon the processes that generate the residual and inputs to that process. 06-096 C.M.R. ch. 405, § 6(D)(2)(o) further requires that in addition to specific parameters already identified in 06-096 C.M.R. ch. 405, § 6(D)(2), the Department may require analysis for other parameters that, based on a description of the process generating the residual, may be in the residual in significant concentrations to adversely impact the utilization program. Standard Condition 3 to all solid waste facility licenses requires a licensee to submit all reports and information requested by the Department demonstrating that the licensee has complied or will comply with all terms and conditions of their approval. License terms and conditions include compliance with all applicable operating rules in accordance with 06-096 C.M.R. ch. 400, § 3(E).

Sampling and Analysis Required:

The Department is now requiring all sludge/biosolids program licensees and sludge/biosolids composting facilities to test their material for PFOA, PFOS, and PFBS. Your Sampling and Analytical Work Plan (SAWP) must be updated to include sampling and analysis for these compounds on an ongoing basis. We recommend you follow the Department's PFAS sampling guidance (Attachment 1) and update your SAWP accordingly. Please pay particular attention to the summary of prohibited and acceptable items for use in PFAS sampling (appended as Attachment 1). PFAS sampling requires specific procedures to prevent inadvertent cross-contamination of samples. Your updated SAWP must be submitted to the Department for review and approval by April 12, 2019 and all initial sampling must be conducted in accordance with the Department's guidance no later than May 7, 2019. You must use one of the laboratories approved by the Department to test for these compounds. A list of prequalified laboratories is appended as Attachment 2. All data must be submitted to the Department in Electronic Data Deliverable (EDD) format, Version 6.0, along with a .pdf copy of the complete laboratory report including quality control and quality assurance information within 10 days of receipt. Results from this initial round of testing will provide the Department with critical data which will inform our determination regarding the need for and frequency of additional testing for these compounds.

Prohibition:

Pursuant to the provisions of 06-096 C.M.R. ch. 419, § 5(A), sludge/biosolids and sludge/biosolids-derived compost or products may not be land applied if the screening concentrations for PFOA, PFOS or PFBS in 06-096 C.M.R. ch. 418, Appendix A are exceeded unless and until the provisions of 06-096 C.M.R. ch. 419, § 5(B) are met. The land application and/or distribution of sludge or sludge-derived products cannot resume until approved by the Department.

Questions:

If you have any questions, please contact Carla Hopkins at Carla.J.Hopkins@maine.gov or 207-215-3314.

¹ <https://www.epa.gov/pfas/basic-information-pfas>



COVER SHEET
STANDARD OPERATING PROCEDURE-ADDENDUM

OPERATION TITLE: DEVELOPMENT OF A SAMPLING AND ANALYSIS PLAN-

ADDENDUM - A – ADDITIONAL REQUIREMENTS FOR THE
SAMPLING OF PERFLUORINATED ALKYLATED
SUBSTANCES (PFASs), PERFLUOROOCTANOIC ACID
(PFOA) and PERFLUOROOCTANE SULFONATE (PFOS).



1.0 APPLICABILITY

This Standard Operating Procedure (SOP) ADDENDUM applies to all programs in the Maine Department of Environmental Protection's (MEDEP) Division of Remediation (DR). It is also applicable to all parties that may submit data that will be used by the DEP/DR.

This SOP ADDENDUM is not a rule and is not intended to have the force of law, nor does it create or affect any legal rights of any individual, all of which are determined by applicable statutes and law. This SOP does not supersede statutes or rules.

2.0 PURPOSE

The purpose of this document is to describe the MEDEP/DRs requirements for the development of a Sampling and Analysis Plan (SAP) with specific requirements for the sampling of compounds related to Per- and Polyfluoroalkyl Substances (PFASs), including Perfluorooctanoic acid (PFOA) and Perfluorooctane sulfonate (PFOS).

Prior to conducting any investigative field work, routine monitoring, post closure sampling or any data gathering/sample collection project, a SAP will be developed that outlines the goals of the activity and methodology to achieve that goal. A well-developed SAP that is reviewed by all field team members will assure that the goals are obtainable, the methodology is consistent, and the data generated will meet the Data Quality Objectives (DQOs) for the project.

Given the ubiquitous nature of PFAS compounds, the low detection levels that are generally requested, and the different methodologies for which these compounds are tested, additional requirements regarding sampling methodology, equipment, and analysis for PFAS compounds should be included as part of the sampling plan and during the sampling event. This document outlines those specific requirements to be included in a PFAS sampling plan and during sampling.

3.0 GUIDELINES AND PROCEDURES

3.1 INTRODUCTION

A sampling and analysis plan, regardless of whether sampling for PFAS compounds or other potential contaminants, should include all the elements in SOP RWM-DR-014 – Development of a Sampling and Analysis Plan. Although not required to be included in the SAP, (as outlined in SOP RWM-DR-014), an assessment of the existing data should be conducted, a site reconnaissance completed, a conceptual site model developed, and data quality objectives determined as part of planning to assure the SAP will meet the goals of the sampling.

The SAP itself should include the goal of the sampling, end use of data, data quality objectives, schedule, sampling methodology, sampling locations, media to be sampled, analytical parameters, and QA/QC samples. Additionally, a site specific health and safety plan may be necessary (see SOP-DR-014) depending on the scope of the sampling event. For example, collection of samples in a large or moving water body, or as part of large sampling effort



involving drilling rigs and/or excavation equipment would require a health and safety plan; residential well sampling would likely not.

3.2 SAMPLING METHODOLOGY/EQUIPMENT

A description of the sampling methodology will be included in the SAP. Generally, reference to an appropriate SOP for the sample methodology will be sufficient. The Division has developed multiple SOPs for sample collection of most media; please refer to the Division of Remediation's Quality Assurance Plan - Attachment B – Data Collection SOPs for a list of all data collection standard operating procedures.

3.2.1 Sampling Methodology

Sampling for PFAS will follow the standard procedures as outlined in the specific sampling method SOPs. In addition, the following task must be included in the SAP and field staff must perform the task as described below to prevent contamination of the sample:

“Prior to sampling each location the sample handler must wash their hands and don nitrile gloves. PFAS contamination during sample collection can occur from several common sources, including food packaging and certain foods and beverages. Proper hand washing and wearing nitrile gloves will help to minimize this type of accidental contamination of the samples.”

It should be noted that samples collected for PFAS analysis do not have to be headspace free.

3.2.2 Sampling Equipment/Supplies/Personal Protective Equipment (PPE)

The low detection limits required for PFAS water analysis and their common occurrence in frequently used items warrant attention to equipment and PPE used for sampling. A sampling equipment list for PFAS projects should follow the material guidelines in Table 1 of Attachment A, avoiding use of LDPE and any Teflon-lined equipment or tubing. If field decontamination of non-disposable equipment is necessary, washing with an approved soap solution, rinsing with DI water and then a rinse with laboratory-supplied PFAS-free water is recommended. New nitrile gloves should be used between locations and activities. Other recommended clothing and PPE requirements are noted in Table 1 of Attachment A.

3.3 Media Sampled/Analytical Parameters

A chart outlining the media collected and sample analysis methodology will be included in the SAP.

PFOA and PFOS are the typical potential contaminants of concern (COCs) at PFAS sites, although laboratory reporting lists may include 12 to 26 PFAS compounds depending upon method and laboratory. An additional analysis that may be warranted is the sum of all PFAS present, either by total extractable fluorinated compounds (TOP analysis) or evaluation of total



fluorine by a method such as proton induced gamma-ray emission (PIGE). Both of these techniques can be followed by analysis of specific compounds, to assess the presence of precursors in environmental media that are not captured by the compound specific methods.

Parameters will be identified by either laboratory analysis methodology number, or generally accepted name of analysis. Given the different methods currently available for sampling PFAS, there must be a clear understanding between the project manager and the laboratory providing the analysis as to what the media sampled, test methodology, and detection levels will be.

Table 1 provides several current methods with their associated media:

TABLE 1
Media/Analytical Methodology

MEDIA	LABORATORY METHOD	HOLD TIME*/ PRESERVATION	ANALYSIS TIME	Reporting List
Drinking Water**	USEPA Method 537	14 days to extraction/Trizma***	28 days after extraction	Method specific
Groundwater	Modified Method 537	14 days to extraction/<6°C	28 days after extraction	DEP Minibid list ****
Surface Water	Modified Method 537	14 days to extraction/<6°C	28 days after extraction	DEP Minibid list ****
Soil/Sediment/sludge	Modified Method 537	14 days to extraction/<6°C	28 days after extraction	DEP Minibid list ****
Other (vegetation...)	Modified Method 537	Lab specific	Lab specific	DEP Minibid list ****
Water or Soil	TOP or other total fluorinated analysis	Lab specific/<6°C	Lab specific	Method specific

* Hold times may vary with contracted laboratory

** USEPA 537 is the only certified method for drinking water

*** Trizma needed for samples that may contain residual chlorine from treated water sources

**** Longer reporting lists may vary between laboratories, generally the DEP mini-bid list can be used for comparison to other selected laboratories

Other methods may be appropriate based on the data quality objectives of the sampling project.

The contracted analytical laboratory must be Maine certified to perform any method for which Maine provides certification. The contract lab must be able to accommodate the sample load and perform the analyses within holding times. The contract lab must be able to achieve PQLs, for all analyses, which are below the associated regulatory guideline value.



Deviations can be made from the laboratory method on a site or event specific basis, based on the goals of the sampling, end use of the data, and the data quality objectives. Rationale for deviations from these methods should be described in the SAP and/or the final report.

As with all parameters, containers, preservation, and holding times will be as recommended by the laboratory providing analytical services. Special or out of the ordinary containers or preservation should be noted in the SAP.

3.4 FIELD QC SAMPLES

Sample collection for PFAS analysis does not require specific field QC samples outside the normal requirements.

General recommendations for all sampling include one aqueous field blank, per field event, to be analyzed for PFASs to determine if water samples have been contaminated by sources unrelated to the project area, and to assess the overall field procedures. An equipment blank may be needed if non-dedicated equipment is used. The field blank is typically one bottle of PFAS-free water supplied by the laboratory, which is uncapped and poured to a second bottle. For multi-day events, one blank per day should be considered. If non-disposable equipment is used a PFAS-free water equipment blank is warranted to check field decontamination procedures.

4.0 PFAS SPECIFIC TEMPLATE

In the instances of a PFAS only sampling event, in which samples are being collected from a project which has a history of sampling for other analytes and a well-developed conceptual site model and/or an SAP already exists, a PFAS sampling specific template has been developed which provides the general requirements of a sampling plan. This template can be found in Attachment A of this Addendum.

5.0 REPORT GENERATION

As stated in SOP RWM-DR-014, A Sampling Event Trip Report (SETR) will be developed for every sampling event (see MEDEP/DR SOP# RWM-DR-013). The staff person responsible for developing the SETR will be stated in the SAP. Data obtained as part of the SAP will be assessed in the final report for which the data has been collected.



ATTACHMENT A
PFOA SAMPLING AND ANALYSIS PLAN FORM TEMPLATE

1.1 INTRODUCTION

The introduction will state the objectives of the sampling plan which include:

- Goals of the sampling plan;
- End use of data.

2.0 BACKGROUND INFORMATION

A BRIEF explanation of the background of the Site and/or conceptual site model (CSM) and reason for sampling for PFAS will be presented.

3.0 SITE SPECIFIC HEALTH AND SAFETY PLAN

If determined necessary, a Site Specific Health and Safety plan (HASP) will be developed and attached.

4.1 SAMPLING METHODOLOGY/ EQUIPMENT

A description of the sampling methodology will be included in the SAP. In instances where a MEDEP/DR SOP is available, reference to SOPs by either name or document number is sufficient.

Currently, the MEDEP/DR QAP has SOPs for the following sample collection tasks which may be pertinent to PFAS sampling:

- 001-Water-Sample-Collection-From-Water-Supply-Wells;
- 002-Groundwater-for-Site-Investigation;
- 003-Low-Flow-Groundwater-Sampling;
- 004-surface-water-sediment;
- 006-soil-sampling;
- 010-Container-Sampling;
- 015-Incremental-sample-methodology;
- 023-Pore-Water-Sampling.

Other SOPs may be utilized on a project specific basis if MEDEP/DR does not have a current SOP for sampling a particular media or situation. Prior Department approval is necessary.

Prior to sampling each location the sample handler must wash their hands and don nitrile gloves. PFAS contamination during sample collection can occur from a number of common sources, including food packaging and certain foods and beverages. Proper hand washing and wearing nitrile gloves will help to minimize this type of accidental contamination of the samples.

Some sampling equipment, field supplies, field clothing and personal protective equipment are prohibited when sampling for PFAS. Table 1 outlines the prohibited items. This table must be included in the SOP and field staff informed as to what equipment is allowed.

ATTACHMENT A -
PFAS SAMPLING AND ANALYSIS PLAN FORM TEMPLATE –
03/20/2019

Table 1: Summary of Prohibited and Acceptable Items for Use in PFAS Sampling

Prohibited Items	Acceptable Items
Field Equipment	
Teflon® containing materials. Aluminum foil.	High-density polyethylene (HDPE) and stainless steel materials
Storage of samples in containers made of LDPE materials	Acetate direct push liners
Teflon® tubing	Silicon or HDPE tubing
Waterproof field books. Water resistant sample bottle labels.	Loose paper (non-waterproof). Paper sample labels covered with clear packing tape.
Plastic clipboards, binders, or spiral hard cover notebooks	Aluminum or Masonite field clipboards
	Sharpies®, pens
Post-It Notes	
Chemical (blue) ice packs	Regular ice
Excel Purity Paste TFW Multipurpose Thread Sealant Vibra-Tite Thread Sealant	Gasoids NT Non-PTFE Thread Sealant Bentonite
Equipment with Viton Components (need to be evaluated on a case by case basis, Viton contains PTFE, but may be acceptable if used in gaskets or O - rings that are sealed away and will not come into contact with sample or sampling equipment.)	
Field Clothing and PPE	
New clothing or water resistant, waterproof, or stain treated clothing, clothing laundered with fabric softeners, clothing containing Gore-Tex™	Well-laundered clothing, defined as clothing that has been washed 6 or more times after purchase, made of synthetic or natural fibers (preferable cotton)
Clothing laundered using fabric softener	No fabric softener
Boots containing Gore-Tex™	Boots made with polyurethane and PVC
	Reflective safety vests, Tyvek®, Cotton Clothing, synthetic under clothing, body braces
No cosmetics, moisturizers, hand cream, or other related products as part of personal cleaning/showering routine on the morning of sampling	Sunscreens - Alba Organics Natural Sunscreen, Yes To Cucumbers, Aubrey Organics, Jason Natural Sun Block, Kiss my face, Baby sunscreens that are “free” or “natural” Insect Repellents - Jason Natural Quit Bugging Me, Repel Lemon Eucalyptus Insect repellent, Herbal Armor, California Baby Natural Bug Spray, BabyGanics

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	Sunscreen and insect repellent - Avon Skin So Soft Bug Guard Plus – SPF 30 Lotion
Sample Containers	
LDPE, glass containers or passive diffusion bags.	HDPE (any media) or polypropylene (only for EPA Method 537 samples)
Teflon®-lined caps	Lined or unlined HDPE or polypropylene caps
Rain Events	
Waterproof or resistant rain gear	Polyurethane, vinyl, wax or rubber-coated rain gear. Gazebo tent that is only touched or moved prior to and following sampling activities
Equipment Decontamination	
Decon 90	Alconox® and/or Liquinox®
Water from an on-site well	Potable water from municipal drinking water supply (if tested as PFAS-free)
Food Considerations	
All food and drink, with exceptions noted on the right	Bottled water and hydration drinks (i.e. Gatorade® and Powerade®) to be brought and consumed only in the staging area

It is recommended that all water samples will be collected using dedicated or disposable sampling equipment where possible. Any re-usable equipment, such as plumbing fittings, that may be needed in certain cases to obtain a sample from the pressure tank tap, should be decontaminated using Alconox/Liquinox soap and rinsed with DI or PFAS-free water prior to use and between locations.

5.0 Sample Locations

A map showing planned sampling locations will be included in the sampling plan. If locations are not pre-determined, the method that samples will be chosen and collected (field observations, random, etc.) will be outlined in the SAP. Field or laboratory compositing procedures will also be described, if applicable.

This section should also indicate sampling collection priority and order, to assure that the most important samples are obtained, and that sampling is generally done from low areas of contamination to higher levels of contamination. It is recommended that critical samples be collected in duplicate.

6.0 Media Sampled

A chart outlining the media collected and sample analysis will be included in the SAP. Table 2 provides several current methods with their associated media:

TABLE 2
Media/Analytical Methodology

MEDIA	LABORATORY METHOD	HOLD TIME*/ PRESERVATION	ANALYSIS TIME	Reporting List
Drinking Water	USEPA Method 537	14 days to extraction/Trizma**	28 days after extraction	Method specific
Groundwater	Modified Method 537	14 days to extraction/<6°C	28 days after extraction	DEP Minibid list ***
Surface Water	Modified Method 537	14 days to extraction/<6°C	28 days after extraction	DEP Minibid list ***
Soil/Sediment/ Sludge	Modified Method 537	14 days to extraction/<6°C	28 days after extraction	DEP Minibid list ***
Other (vegetation...)	537 Modified	Lab specific	Lab specific	DEP Minibid list ***
Water or Soil	TOP or other total fluorinated analysis	Lab specific/<6°C	Lab specific	Method specific

* Hold times may vary with contracted laboratory, listed times from Vista Analytical Inc.

** Trizma needed for samples that may contain residual chlorine from treated water sources

*** Longer reporting lists may vary between laboratories, generally the DEP mini-bid list can be used for comparison to other selected laboratories

Other methods may be appropriate based on the data quality objectives of the sampling project.

The contracted analytical laboratory must be Maine certified to perform any method for which Maine provides certification. The contract lab must be able to accommodate the sample load and perform the analyses within holding times. The contract lab must be able to achieve PQLs, for all analyses, which are below the associated regulatory guideline value.

Containers, preservation, and holding times will be as recommended by the laboratory providing analytical services. Special or out of the ordinary containers or preservation should be noted in the SAP.

7.0 FIELD QC SAMPLES

The specific needs for QC samples for the project will be outlined. General requirements for PFAS sampling events include one aqueous field blank, per field event, to be tested for PFASs to determine if water samples have been contaminated by sources unrelated to the project area, and to assess the overall field procedures. The field blank is typically one bottle of PFAS-free water supplied by the laboratory, which is uncapped and poured to a second bottle. An equipment blank should be collected if non-dedicated equipment is used. For multi-day events, one blank per day should be considered, and for large events one blank per 10 or 20 samples is warranted, depending upon the project requirements. All blanks should be collected with laboratory supplied PFAS-free water. A source-water blank is handled like a trip blank, and assesses the laboratory supplied water and sample containers. This blank may be warranted depending on DEP experience with the laboratory or sensitivity of the project.

ATTACHMENT A -
PFAS SAMPLING AND ANALYSIS PLAN FORM TEMPLATE –
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Additionally, any QC samples that will be collected in the field that are required as part of laboratory QC requirements and to allow data validation will be outlined.

4.9 REPORT GENERATION

A Sampling Event Trip Report (SETR) will be developed for every sampling event (See MEDEP/DR SOP# RWM-DR-013). Staff person responsible for developing the SETR will be stated.



LABORATORIES APPROVED BY DEP FOR PFAS ANALYSIS

Alpha Analytical

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